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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:) Attorney Docket No: LAM2P461
REDEKER et al.) Examiner: Edwards, Laura Estelle
Application No: 10/734,704) Group Art Unit: 1734
Filed: December 12, 2003) Date: November 27, 2006
For: METHOD AND APPARATUS FOR)
SEMICONDUCTOR WAFER)
PLANARIZATION)

CERTIFICATE OF MAILING

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Signed: 
Kenneth D. Wright

TRANSMITTAL OF APPEAL BRIEF
(PATENT APPLICATION -- 37 CFR 192)

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Sir:

This Appeal Brief is in furtherance of the Notice of Appeal filed in this case on September 25, 2006.

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This application is on behalf of:

☐ Small Entity ☒ Large Entity

Pursuant to 37 CFR 1.17(f), the fee for filing the Appeal Brief is:

☐ \$250.00 (Small Entity) ☒ \$500.00 (Large Entity)

☐ Appeal Brief Fee has already been paid. Prosecution was re-opened by Examiner in response to the Appeal Brief, filed _____.

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136 apply:

☐ Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

<u>Months</u>	<u>Large Entity</u>	<u>Small Entity</u>
<input type="checkbox"/> one	\$120.00	\$60.00
<input type="checkbox"/> two	\$450.00	\$225.00
<input type="checkbox"/> three	\$1,020.00	\$510.00
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If an additional extension of time is required, please consider this a petition therefor.

☐ An extension for __ months has already been secured and the fee paid therefore of \$ is deducted from the total fee due for the total months of extension now requested.

☒ Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that Applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Total Fees Due:

Appeal Brief Fee	\$500.00
Extension Fee (if any)	\$
Total Fee Due	<u>\$500.00</u>

☒ Enclosed is Check No. 17382 in the amount of \$500.00.

☐ The Commissioner is authorized to charge the total fees due of \$___ to Deposit Account No. 50-0850, (Order No. ____).

☒ The Commissioner is authorized to charge any additional required fees or credit any overpayment to Deposit Account No. 50-0850, (Order No. LAM2P461).

One additional copy of this transmittal is enclosed for fee processing.

Respectfully submitted,
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Application No. 10/734,704

PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

EX PARTE REDEKER et al.

Application for Patent

Filed December 12, 2003

Application No. 10/734,704

FOR:

**Method and Apparatus for
Semiconductor Wafer Planarization**

APPEAL BRIEF

CERTIFICATE OF MAILING

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I. REAL PARTY IN INTEREST

The real party in interest is Lam Research Corporation, the assignee of the present application.

II. RELATED APPEALS AND INTERFERENCES

The Applicants are not aware of any related appeals or interferences.

III. STATUS OF CLAIMS

A total of 27 claims were presented during prosecution of this application. Claims 10-20 were cancelled. The Applicants appeal rejected claims 1-9 and 21-27.

IV. STATUS OF AMENDMENTS

All claim amendments have been entered. The present appeal is made from the decision of the Primary Examiner as provided in the Final Office Action of May 23, 2006.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 recites an apparatus for depositing a planarizing layer over a wafer. [p. 7, lines 2-5] The apparatus includes a tank defined by a bottom and an enclosing wall. [p. 8, lines 2-3] The tank is configured to contain an electroless plating solution. [p. 8, lines 3-4] The apparatus also includes a wafer support structure disposed within the tank. [p. 9, lines 8-10] The wafer support structure is configured to support a wafer at a submerged position within the electroless plating solution to be contained within the tank. [p. 9, lines 8-10] The apparatus also includes a planar member disposed above and substantially parallel to the wafer support structure. [p. 9, lines 23-24] The planar member is capable of being positioned proximate to the wafer to be supported by the wafer support structure, such that the planar member serves as an upper confinement boundary for

material deposited on the wafer through electroless plating reactions.[p. 10, lines 17-20, and p. 13, lines 10-12] The apparatus further includes a radiant energy source disposed above the planar member and above the wafer support structure. [p. 12, lines 1-3] The radiant energy source is oriented to direct radiant energy through the planar member and to the wafer to be supported by the wafer support structure. [p. 12, lines 3-5]

Independent claim 22 recites an apparatus for depositing a planarizing layer over a wafer. [p. 7, lines 2-5] The apparatus includes a tank defined by a bottom and an enclosing wall. [p. 8, lines 2-3] The tank is configured to contain an electroless plating solution. [p. 8, lines 3-4] The apparatus also includes a wafer support structure disposed within the tank. [p. 9, lines 8-10] The wafer support structure is configured to support a wafer at a submerged position within the electroless plating solution to be contained within the tank. [p. 9, lines 8-10] The apparatus also includes a planar member disposed above and substantially parallel to the wafer support structure. [p. 9, lines 23-24] The planar member is capable of being positioned proximate to the wafer to be supported by the wafer support structure, such that the planar member serves as an upper confinement boundary for material deposited on the wafer through electroless plating reactions. [p. 10, lines 17-20, and p. 13, lines 10-12] The apparatus further includes a radiant energy source disposed above the planar member and above the wafer support structure. [p. 12, lines 1-3] The radiant energy source is oriented to direct radiant energy through the planar member such that a substantially uniform amount of radiant energy is applied to a top surface of the wafer to be supported by the wafer support structure. [p. 12, lines 3-5, and p. 13, lines 23-24]

Independent claim 24 recites an apparatus for depositing a planarizing layer over a wafer. [p. 7, lines 2-5] The apparatus includes a tank defined by a bottom and an enclosing wall. [p. 8, lines 2-3] The tank is configured to contain an electroless plating solution. [p.

8, lines 3-4] The apparatus also includes a wafer support structure disposed within the tank. [p. 9, lines 8-10] The wafer support structure is configured to support a wafer at a submerged position within the electroless plating solution to be contained within the tank. [p. 9, lines 8-10] The apparatus also includes a planar member disposed above and proximate to the wafer to be supported by the wafer support structure, such that the planar member serves as an upper confinement boundary for material deposited on the wafer through electroless plating reactions. [p. 9, lines 23-24, and p. 10, lines 17-20, and p. 13, lines 10-12] The apparatus also includes a backing member disposed against a backside of the planar member, wherein the backside of the planar member faces away from the wafer support structure. [p. 11, lines 10-12] The backing member is configured to control a planarity of the planar member. [p. 11, lines 12-14] The apparatus further includes a radiant energy source disposed to direct radiant energy through the planar member and to the wafer to be supported by the wafer support structure. [p. 12, lines 1-5]

It should be appreciated that the above discussion represents only a summary of the present invention. A more in-depth discussion of the present invention is provided in the Detailed Description section of the application.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Claims 1-8 and 22-24 were rejected under 35 U.S.C. 102(e) as being anticipated by Montierth et al. ("Montierth" hereafter) (U.S. Patent Application Publication No. 2005/0003737).

B. Claims 1-7, 22, and 24 were rejected under 35 U.S.C. 102(b) as being anticipated by Sandaiji et al. ("Sandaiji" hereafter) (U.S. Patent No. 4,982,065).

C. Claims 1-7, 22, and 24 were rejected under 35 U.S.C. 103(a) as being obvious over Sandaiji.

D. Claim 9 was rejected under 35 U.S.C. 103(a) as being unpatentable over Montierth in view of Mayer et al. ("Mayer" hereafter) (U.S. Patent No. 5,096,550).

E. Claims 21 and 25 were rejected under 35 U.S.C. 103(a) as being unpatentable over Montierth.

F. Claim 26 was rejected under 35 U.S.C. 103(a) as being unpatentable over Montierth as applied to claim 25 above, and further in view of Barringer et al. ("Barringer" hereafter) (U.S. Patent No. 6,496,001).

G. Claim 27 was rejected under 35 U.S.C. 103(a) as being unpatentable over Montierth as applied to claim 25 above, and further in view of Zuniga et al. ("Zuniga" hereafter) (U.S. Patent Application Publication No. 2004/0192173).

H. Claims 8 and 9 were rejected under 35 U.S.C. 103(a) as being unpatentable over Sandaiji in view of Ballantine et al. ("Ballantine" hereafter) (U.S. Patent No. 6,699,400).

I. Claim 21 was rejected under 35 U.S.C. 103(a) as being unpatentable over Sandaiji.

J. Claim 23 was rejected under 35 U.S.C. 103(a) as being unpatentable over Sandaiji in view of Bjornson et al. ("Bjornson" hereafter) (U.S. Patent No. 6,900,889).

VII. ARGUMENT

A. Rejections of claims 1-8 and 22-24 under 35 U.S.C. 102(e)

Claims 1-8 and 22-24 were rejected under 35 U.S.C. 102(e) as being anticipated by Montierth.

With regard to claim 1, the Examiner has asserted that Montierth teaches the planar member disposed above and substantially parallel to the wafer support structure. More specifically, the Examiner asserts that the vibrational member 3802b of Montierth (Fig. 38) teaches the planar member of claim 1 that is positioned proximate to the wafer and serves as an upper confinement boundary for material deposited on the wafer through electroless plating reactions. The Applicants respectfully disagree with this assertion by the Examiner.

While the vibrational member 3802b of Montierth is depicted in Fig. 38 as being planar, the vibrational member 3802b is not disclosed as being positionable proximate to the upper surface of the wafer. Montierth (Fig. 38) simply shows the vibrational member 3802b as being fixed to the top of the chamber at a substantial distance from the substrate. Thus, Montierth (Fig. 38) does not teach that the vibrational member 3802b is capable of being positioned proximate to the wafer, as required by claim 1.

The Examiner has asserted that Montierth teaches variation of the wafer support thickness, i.e., the lower vibrational member 3802a thickness in Fig. 38, to allow for positioning of the wafer proximate to the upper vibrational member 3802b. In an attempt to support this assertion, the Examiner has referred to Fig. 1 of Montierth which appears to show a thicker wafer support, i.e., lower vibrational member 104, relative to the lower vibrational member 3802a. The Examiner has inferred that the apparent thickness difference between the lower vibrational member 104 and the lower vibrational member

3802a represents a teaching of the capability to position the planar member of claim 1 proximate to the wafer, such that the planar member serves as an upper confinement boundary for material deposited on the wafer through electroless plating reactions.

However, with respect, the Applicants submit that there is no teaching or suggestion within Montierth that the lower vibrational member 3802a thickness be adjusted to enable the upper vibrational member 3802b to be positioned proximate to the wafer, wherein the proximate positioning of the upper vibrational member 3802b would allow the upper vibrational member 3802b to serve as an upper confinement boundary for material deposited on the wafer through electroless plating reactions. Additionally, the Applicants submit that because the upper vibrational member 3802b of Montierth is defined to vibrate, i.e., move, the upper vibrational member 3802b does not represent a suitable upper confinement boundary for material deposited on the wafer through electroless plating reactions.

The Examiner has further asserted that Montierth teaches the radiant energy source of claim 1. Specifically, the Examiner has asserted that the adjacent piezoelectric crystals 3804 of Fig. 38 teach the radiant energy source of claim 1. However, Montierth (particularly [0483]) teaches the piezoelectric crystals 3804 as representing a source of "vibrational energy." As is well known in the art, piezoelectric crystals 3804 vibrate at a frequency that is a function of the electric voltage applied thereto. Vibrational energy of the piezoelectric crystals 3804 is transmitted mechanically to surrounding media, such as the upper vibrational member 3802b and the fluid interfacing therewith. The Applicants submit that it is not appropriate for the Examiner to draw an equivalence between the "radiant energy," as recited in claim 1, and "vibrational energy." Thus, the Applicants respectfully submit that Montierth does not teach the "radiant energy source" required by claim 1.

Furthermore, with regard to dependent claim 6, the Applicants submit that Montierth does not teach a planar member that is broadly flexible and locally rigid. Notwithstanding the fact that the vibrational member 3802b of Montierth does not teach the planar member of claim 1, it should be further noted that the vibrational member 3802b of Montierth is not disclosed as being broadly flexible and locally rigid.

Additionally, with regard to dependent claim 7, the Examiner has asserted that the adjacent piezoelectric crystals 3804 of Montierth teach the backing member disposed against the backside of the planar member and configured to control a planarity of the planar member. Again, notwithstanding the fact that the vibrational member 3802b of Montierth does not teach the planar member of claim 1, Montierth does not include any teaching with regard to the adjacent piezoelectric crystals 3804 influencing a planarity of the vibrational member 3802b.

Because independent claims 22 and 24 include essentially the same planar member and radiant energy source features as claim 1, the Applicants submit that each of claims 22 and 24 is not anticipated by Montierth for at least the same reasons as discussed above with respect to claim 1. Moreover, with regard to claim 24, Montierth does not teach the backing member configured to control a planarity of the planar member. The Examiner has asserted that the adjacent piezoelectric crystals 3804 of Montierth (Fig. 38) teach the backing member of claim 24. However, the piezoelectric crystals 3804 are not disclosed by Montierth as having the ability to control the planarity of the upper vibrational member 3802b. Furthermore, the separated nature of the adjacent piezoelectric crystals 3804 of Montierth as dispersed across the top of the upper vibrational member 3802b does not infer a teaching that the piezoelectric crystals 3804 are capable of controlling the planarity of the upper vibrational member 3802b.

It is well-established that the standard for lack of novelty (i.e., "anticipation") under 35 U.S.C. 102 is one of strict identity. To anticipate a claim for a patent, a single prior source must contain all its essential elements. *See, e.g., Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 231 U.S.P.Q. 81, 90 (Fed. Cir. 1986). "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Additionally, "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

In view of the foregoing, the Applicants submit that Montierth fails to teach each and every feature of independent claims 1, 22, and 24, respectively, as required for anticipation under 35 U.S.C. 102. Therefore, the Applicants submit that each of claims 1, 22, and 24 is not anticipated under 35 U.S.C. 102 by Montierth.

Because each of claims 2-8 incorporates the features of independent claim 1, each of claims 2-8 is patentable for at least the same reasons provided for claim 1. Additionally, because claim 23 incorporates the features of independent claim 22, claim 23 is patentable for at least the same reasons provided for claim 22. Therefore, the Applicants submit that each of claims 2-8 and 22 is not anticipated under 35 U.S.C. 102 by Montierth.

The Board is respectfully requested to overturn the Examiner's rejections of claims 1-8 and 22-24 under 35 U.S.C. 102 with regard to anticipation by Montierth.

B. Rejections of claims 1-7, 22, and 24 under 35 U.S.C. 102(b)

Claims 1-7, 22, and 24 were rejected under 35 U.S.C. 102(b) as being anticipated by Sandaiji.

Sandaiji is concerned with removal of material from a gapped bar through an etching process. Sandaiji is not concerned with deposition of materials, particular deposition of material on a wafer through electroless plating reactions. The Examiner has asserted that the apparatus of Sandaiji is capable of being used for a material deposition process in addition to the discussed etching process, even though Sandaiji is silent with regard to such a material deposition process.

The Applicants submit that Sandaiji does not teach the planar member recited in each of claims 1, 22, and 24, wherein the planar member is capable of being positioned proximate to the wafer and capable of serving as an upper confinement boundary for material deposited on the wafer through electroless plating reactions. The Examiner has asserted that the quartz window 7 of Sandaiji is capable of being positioned proximate to the wafer and is capable of serving as an upper confinement boundary for material deposited on the wafer through electroless plating reactions. This assertion by the Examiner represents an extrapolation of the actual apparatus teachings of Sandaiji. In other words, Sandaiji does not teach or suggest that the quartz window 7 is defined to be positioned proximate to the wafer to serve as an upper confinement boundary for material deposited on the wafer through electroless plating reactions. Also, there is no teaching in Sandaiji that the level adjustment mechanism 6 is capable of positioning the quartz window 7 proximate to the wafer, such that the quartz window 7 provides an upper confinement boundary for material deposited on the wafer through electroless plating reactions.

Furthermore, with regard to dependent claim 6, the Applicants submit that Sandaiji does not teach a planar member that is broadly flexible and locally rigid. Notwithstanding the fact that the quartz window 7 of Sandaiji does not teach the planar member of claim 1,

it should be further noted that the quartz window 7 of Sandaiji is not disclosed as being broadly flexible and locally rigid.

With regard to claim 22, Sandaiji does not teach the radiant energy source oriented to direct radiant energy through the planar member such that a substantially uniform amount of radiant energy is applied to the top surface of the wafer. Rather, Sandaiji teaches a laser beam 8 emitted from a laser source 9 and irradiated through a lens system 10 and the quartz window 7 onto the gapped bar 4. Sandaiji further teaches that the diameter of the laser beam is on the order of tens of micrometers. The laser of Sandaiji is not defined to apply a substantially uniform amount of radiant energy to the top surface of the wafer. Rather, the laser of Sandaiji is defined to apply radiant energy to the gapped bar at specific locations corresponding to a desired pattern to be etched on the gapped bar. Furthermore, if the laser of Sandaiji were somehow modified to apply the laser beam uniformly to the top surface of the gapped bar, the entire top surface of the gapped bar would be uniformly etched, thus, rendering the apparatus of Sandaiji inoperable with respect to etching a specific pattern in the top surface of the gapped bar. It should be noted that the same arguments provided above with regard to independent claim 22 are also applicable to dependent claim 5.

Further with regard to claim 24, Sandaiji does not teach the backing member disposed against the backside of the planar member, wherein the backing member is defined to control the planarity of the planar member. The Examiner has asserted that the lens system 10 of Sandaiji teaches the backing member of claim 24. However, because the lens system 10 of Sandaiji has no physical contact with the quartz window 7, it is not reasonable to conclude that the lens system 10 is capable of controlling the planarity of the quartz window 7. Additionally, Sandaiji does not teach that the lens system 10 is defined to control the planarity of the quartz window 7. Therefore, the Applicants submit that

Sandaiji simply does not teach the backing member of claim 24. It should be noted that the same arguments provided above with regard to independent claim 24 are also applicable to dependent claim 7.

It is well-established that the standard for lack of novelty (i.e., "anticipation") under 35 U.S.C. 102 is one of strict identity. To anticipate a claim for a patent, a single prior source must contain all its essential elements. *See, e.g., Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 231 U.S.P.Q. 81, 90 (Fed. Cir. 1986). "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Additionally, "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

In view of the foregoing, the Applicants submit that Sandaiji fails to teach each and every feature of independent claims 1, 22, and 24, respectively, as required for anticipation under 35 U.S.C. 102. Therefore, the Applicants submit that each of claims 1, 22, and 24 is not anticipated under 35 U.S.C. 102 by Sandaiji.

Because each of claims 2-7 incorporates the features of independent claim 1, each of claims 2-7 is patentable for at least the same reasons provided for claim 1. Therefore, the Applicants submit that each of claims 2-7 is not anticipated under 35 U.S.C. 102 by Sandaiji.

The Board is respectfully requested to overturn the Examiner's rejections of claims 1-7, 22, and 24 under 35 U.S.C. 102 with regard to anticipation by Sandaiji.

C. Rejections of claims 1-7, 22, and 24 under 35 U.S.C. 103(a)

Claims 1-7, 22, and 24 were rejected under 35 U.S.C. 103(a) as being obvious over Sandaiji.

Sandaiji teaches an apparatus for performing a laser-induced etching process on a gapped bar material to form grooves or holes on a surface of the gapped bar. Specifically, Sandaiji teaches that the gapped bar is positioned in a phosphoric acid aqueous solution or an alkali metal hydroxide aqueous solution. Then, the gapped bar is irradiated by a laser beam having a predetermined power and a predetermined scanning speed. The laser beam induces an etching chemical reaction at the point of incidence with the gapped bar in the aqueous solution. As the laser beam is applied to the gapped bar, the gapped bar is moved relative to the laser beam such that a precise track is etched within the gapped bar.

Because the etching process as taught by Sandaiji is defined to remove material from a surface, the Applicants submit that the etching process and associated apparatus of Sandaiji is not related to or suggestive of material deposition. Simply stated, the method and associated apparatus of Sandaiji is not concerned with deposition of materials. More specifically, Sandaiji does not teach "an apparatus for depositing a planarizing layer over a wafer," as recited in each of independent claims 1, 22, and 24. The Applicants submit that a person of skill in the art, at the time of the invention, concerned with deposition of a planarization layer on a wafer through electroless plating reactions, would not have looked to Sandaiji for relevant teachings.

Sandaiji does not include a teaching or suggestion that the apparatus disclosed therein has utility in the process of depositing material on a semiconductor wafer through electroless plating reactions. "In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was

concerned." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). The Applicants submit that laser-induced etching apparatus of Sandaiji is neither within the field of semiconductor electroless plating, nor reasonably pertinent to depositing a planarizing layer over a semiconductor wafer.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. MPEP §2143.01 Sandaiji is concerned with laser-induced etching of a gapped bar. Sandaiji's disclosure of the laser-induced etching apparatus does not provide a teaching, suggestion, or motivation to one skilled in the art to modify the teachings of Sandaiji to arrive at the apparatus for depositing a planarizing layer over a wafer, as recited in each of independent claims 1, 22, and 24.

The Examiner has further asserted that it is inherent that the apparatus of Sandaiji be used for electrochemical planarization of a wafer. "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999). "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). The Applicants respectfully submit that the Examiner has not provided a basis in fact and/or technical reasoning that supports a determination that configuration of the apparatus of Sandaiji for

electroless plating of a wafer to define a planarizing layer thereon is an "inherent" teaching within Sandaiji.

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). The Applicants submit that Sandaiji fails to teach each and every feature of claims 1, 22, and 24, respectively, as required to establish a prima facie case of obviousness under 35 U.S.C. 103. Specifically, the Applicants submit that Sandaiji does not teach the planar member recited in each of claims 1, 22, and 24, wherein the planar member is capable of being positioned proximate to the wafer and capable of serving as an upper confinement boundary for material deposited on the wafer through electroless plating reactions. The Examiner has asserted that the quartz window 7 of Sandaiji is capable of being positioned proximate to the wafer and is capable of serving as an upper confinement boundary for material deposited on the wafer through electroless plating reactions. This assertion by the Examiner represents an extrapolation of the actual apparatus teachings of Sandaiji. In other words, Sandaiji does not teach or suggest that the quartz window 7 is defined to be positioned proximate to the wafer to serve as an upper confinement boundary for material deposited on the wafer through electroless plating reactions. Also, there is no teaching in Sandaiji that the level adjustment mechanism 6 is capable of positioning the quartz window 7 proximate to the wafer, such that the quartz window 7 provides an upper confinement boundary for material deposited on the wafer through electroless plating reactions.

Furthermore, with regard to dependent claim 6, the Applicants submit that Sandaiji does not teach or suggest a planar member that is broadly flexible and locally rigid. Notwithstanding the fact that the quartz window 7 of Sandaiji does not teach the planar

member of claim 1, it should be further noted that the quartz window 7 of Sandaiji is not disclosed as being broadly flexible and locally rigid.

Further with regard to claim 22, Sandaiji does not teach the radiant energy source oriented to direct radiant energy through the planar member such that a substantially uniform amount of radiant energy is applied to the top surface of the wafer. Rather, Sandaiji teaches a laser beam 8 emitted from a laser source 9 and irradiated through a lens system 10 and the quartz window 7 onto the gapped bar 4. Sandaiji further teaches that the diameter of the laser beam is on the order of tens of micrometers. The laser of Sandaiji is not defined to apply a substantially uniform amount of radiant energy to the top surface of the wafer. Rather, the laser of Sandaiji is defined to apply radiant energy to the gapped bar at specific locations corresponding to a desired pattern to be etched on the gapped bar.

Furthermore, if the laser of Sandaiji were somehow modified to apply the laser beam uniformly to the top surface of the gapped bar, the entire top surface of the gapped bar would be uniformly etched, thus, rendering the apparatus of Sandaiji inoperable with respect to etching a specific pattern in the top surface of the gapped bar. If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984), also see MPEP 2143.01, Section V. It should be noted that the same arguments provided above with regard to independent claim 22 are also applicable to dependent claim 5.

Further with regard to claim 24, Sandaiji does not teach the backing member disposed against the backside of the planar member, wherein the backing member is defined to control the planarity of the planar member. The Examiner has asserted that the lens system 10 of Sandaiji teaches the backing member of claim 24. However, because the lens system 10 of Sandaiji has no physical contact with the quartz window 7, it is not

reasonable to conclude that the lens system 10 is capable of controlling the planarity of the quartz window 7. Additionally, Sandaiji does not teach that the lens system 10 is defined to control the planarity of the quartz window 7. Therefore, the Applicants submit that Sandaiji simply does not teach the backing member of claim 24. It should be noted that the same arguments provided above with regard to independent claim 24 are also applicable to dependent claim 7.

In view of the foregoing, the Applicants submit that Sandaiji does not provide a motivation or a suggestion to modify its teachings in the manner asserted by the Examiner to arrive at the invention as recited in each of independent claims 1, 22, and 24, as required to support a rejection under 35 U.S.C. 103. Also, the Applicants submit that Sandaiji fails to teach each and every feature of each of independent claims 1, 22, and 24, as required to support a rejection under 35 U.S.C. 103. Therefore, the Applicants submit that each of independent claims 1, 22, and 24 is not rendered prima facie obvious under 35 U.S.C. 103 by the teachings of Sandaiji.

Each dependent claim includes all features of its respective independent claim. Therefore, the Applicants submit that each of dependent claims 2-7 is not rendered prima facie obvious under 35 U.S.C. 103 by Sandaiji for at least the same reasons provided for independent claim 1.

The Board is respectfully requested to overturn the Examiner's rejections of claims 1-7, 22, and 24 under 35 U.S.C. 103.

D. Rejection of claim 9 under 35 U.S.C. 103(a)

Claim 9 was rejected under 35 U.S.C. 103(a) as being unpatentable over Montierth in view of Mayer.

Claim 9 incorporates the features of independent claim 1, and is patentable over the cited art of record for at least the same reasons provided for claim 1. Therefore, the

Applicants submit that claim 9 is not rendered prima facie obvious under 35 U.S.C. 103 by the combined teachings of Montierth and Mayer.

The Board is respectfully requested to overturn the Examiner's rejection of claim 9 under 35 U.S.C. 103.

E. Rejections of claims 21 and 25 under 35 U.S.C. 103(a)

Claims 21 and 25 were rejected under 35 U.S.C. 103(a) as being unpatentable over Montierth.

Notwithstanding the fact that the vibrational member 3802b of Montierth does not teach the planar member of claim 1, it should be noted that Montierth does not teach or suggest positioning of the vibrational member 3802b within three micrometers of a top surface of a wafer, as recited in claim 21. Moreover, the Examiner has admitted to Montierth's lack of teaching or suggestion with regard to the features recited in claim 21.

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Because Montierth fails to teach or suggest each and every feature of claim 21, the Applicants submit that claim 21 is not rendered prima facie obvious under 35 U.S.C. 103 by Montierth. Additionally, because claim 21 incorporates the features of independent claim 1, claim 21 is patentable over the cited art of record for at least the same reasons provided for claim 1.

With regard to claim 25, Montierth simply fails to teach or suggest a backing member defined to apply a differential pressure distribution through a planar member to a planarizing surface of the planar member. The Examiner has asserted that the adjacent piezoelectric crystals 3804 of Montierth teach the backing member disposed against the backside of the planar member and configured to control a planarity of the planar member. Notwithstanding the fact that the vibrational member 3802b of Montierth does not teach

the planar member of claim 24, Montierth does not include any teaching with regard to the adjacent piezoelectric crystals 3804 representing a backing member defined to apply a differential pressure distribution through the vibrational member 3802b.

Again, to establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Because Montierth fails to teach or suggest each and every feature of claim 25, the Applicants submit that claim 25 is not rendered prima facie obvious under 35 U.S.C. 103 by Montierth. Additionally, because claim 25 incorporates the features of independent claim 24, claim 25 is patentable over the cited art of record for at least the same reasons provided for claim 24.

The Board is respectfully requested to overturn the Examiner's rejections of claims 21 and 25 under 35 U.S.C. 103.

F. Rejection of claim 26 under 35 U.S.C. 103(a)

Claim 26 was rejected under 35 U.S.C. 103(a) as being unpatentable over Montierth as applied to claim 25, and further in view of Barringer.

Claim 26 incorporates the features of independent claim 24 and dependent claim 25, and is patentable over the cited art of record for at least the same reasons provided for claims 24 and 25. Therefore, the Applicants submit that claim 26 is not rendered prima facie obvious under 35 U.S.C. 103 by the combined teachings of Montierth and Barringer.

Additionally, the Applicants submit that there is no motivation or suggestion within the cited references themselves to have combined their respective teachings in the manner asserted by the Examiner. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill

in the art. MPEP §2143.01 However, the level of ordinary skill in the art cannot be relied upon to provide the suggestion to combine references. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999).

The Board is respectfully requested to overturn the Examiner's rejection of claim 26 under 35 U.S.C. 103.

G. Rejection of claim 27 under 35 U.S.C. 103(a)

Claim 27 was rejected under 35 U.S.C. 103(a) as being unpatentable over Montierth as applied to claim 25, and further in view of Zuniga.

Claim 27 incorporates the features of independent claim 24 and dependent claim 25, and is patentable over the cited art of record for at least the same reasons provided for claims 24 and 25. Therefore, the Applicants submit that claim 27 is not rendered prima facie obvious under 35 U.S.C. 103 by the combined teachings of Montierth and Zuniga.

Additionally, the Applicants submit that there is no motivation or suggestion within the cited references themselves to have combined their respective teachings in the manner asserted by the Examiner. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. MPEP §2143.01 However, the level of ordinary skill in the art cannot be relied upon to provide the suggestion to combine references. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999).

The Board is respectfully requested to overturn the Examiner's rejection of claim 27 under 35 U.S.C. 103.

H. Rejections of claims 8 and 9 under 35 U.S.C. 103(a)

Claims 8 and 9 were rejected under 35 U.S.C. 103(a) as being unpatentable over Sandaiji in view of Ballantine.

Claim 8 incorporates the features of independent claim 1, and is patentable over the cited art of record for at least the same reasons provided for claim 1. Also, claim 9 incorporates the features of independent claim 1, and is patentable over the cited art of record for at least the same reasons provided for claim 1. Therefore, the Applicants submit that each of claims 8 and 9 is not rendered prima facie obvious under 35 U.S.C. 103 by the combined teachings of Sandaiji and Ballantine.

The Board is respectfully requested to overturn the Examiner's rejections of claims 8 and 9 under 35 U.S.C. 103.

I. Rejection of claim 21 under 35 U.S.C. 103(a)

Claim 21 was rejected under 35 U.S.C. 103(a) as being unpatentable over Sandaiji.

Notwithstanding the fact that the quartz window 7 of Sandaiji does not teach the planar member of claim 1, it should be noted that Sandaiji does not teach or suggest positioning of the quartz window 7 within three micrometers of a top surface of a wafer, as recited in claim 21. Moreover, the Examiner has admitted to Sandaiji's lack of teaching or suggestion with regard to the features recited in claim 21.

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Because Sandaiji fails to teach or suggest each and every feature of claim 21, the Applicants submit that claim 21 is not rendered prima facie obvious under 35 U.S.C. 103 by Sandaiji. Additionally, because claim 21 incorporates the features of independent claim 1, claim 21 is patentable over the cited art of record for at least the same reasons provided for claim 1.

The Board is respectfully requested to overturn the Examiner's rejection of claim 21 under 35 U.S.C. 103.

J. Rejection of claim 23 under 35 U.S.C. 103(a)


Claim 23 was rejected under 35 U.S.C. 103(a) as being unpatentable over Sandaiji in view of Bjornson.

Claim 23 incorporates the features of independent claim 22, and is patentable over the cited art of record for at least the same reasons provided for claim 22. Therefore, the Applicants submit that claim 23 is not rendered prima facie obvious under 35 U.S.C. 103 by the combined teachings of Sandaiji and Bjornson.

The Board is respectfully requested to overturn the Examiner's rejection of claim 23 under 35 U.S.C. 103.

In view of the foregoing, the Applicant submits that each of claims 1-9 and 21-27 is patentable. Therefore, the Applicant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's rejections of the claims on appeal.

Respectfully Submitted,
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VIII. CLAIMS APPENDIX

1. An apparatus for depositing a planarizing layer over a wafer, comprising:
a tank defined by a bottom and an enclosing wall, the tank being configured to contain an electroless plating solution;

a wafer support structure disposed within the tank, the wafer support structure being configured to support a wafer at a submerged position within the electroless plating solution to be contained within the tank;

a planar member disposed above and substantially parallel to the wafer support structure, the planar member capable of being positioned proximate to the wafer to be supported by the wafer support structure such that the planar member serves as an upper confinement boundary for material deposited on the wafer through electroless plating reactions; and

a radiant energy source disposed above the planar member and above the wafer support structure, the radiant energy source being oriented to direct radiant energy through the planar member and to the wafer to be supported by the wafer support structure.

2. An apparatus for depositing a planarizing layer over a wafer as recited in claim 1, the planar member being composed of a material capable of transmitting radiant energy emitted from the radiant energy source toward the wafer support structure.

3. An apparatus for depositing a planarizing layer over a wafer as recited in claim 2, wherein the planar member is formed from one of quartz, sapphire, and polymer.

4. An apparatus for depositing a planarizing layer over a wafer as recited in claim 1, wherein the radiant energy source is configured to generate radiant energy having a wavelength range that is capable of selectively heating a material present at a surface of the wafer upon which the radiant energy will be incident.

5. An apparatus for depositing a planarizing layer over a wafer as recited in claim 1, wherein the radiant energy source is configured to apply a substantially uniform amount of the radiant energy over a surface of the wafer upon which the radiant energy will be incident.

6. An apparatus for depositing a planarizing layer over a wafer as recited in claim 1, wherein the planar member is broadly flexible and locally rigid.

7. An apparatus for depositing a planarizing layer over a wafer as recited in claim 1, further comprising:

a backing member disposed against a backside of the planar member, the backside of the planar member facing away from the wafer support structure, the backing member being configured to control a planarity of the planar member.

8. An apparatus for depositing a planarizing layer over a wafer as recited in claim 1, further comprising:

an inlet for supplying the electroless plating solution to the tank; and
an outlet for removing the electroless plating solution from the tank.

9. An apparatus for depositing a planarizing layer over a wafer as recited in claim 1, further comprising:

a heat exchanger capable of maintaining a temperature of the electroless plating solution to be contained within the tank.

21. An apparatus for depositing a planarizing layer over a wafer as recited in claim 1, wherein the planar member is capable of being positioned within three micrometers of a top surface of the wafer to be supported by the wafer support structure.

22. An apparatus for depositing a planarizing layer over a wafer, comprising:

a tank defined by a bottom and an enclosing wall, the tank being configured to contain an electroless plating solution;

a wafer support structure disposed within the tank, the wafer support structure being configured to support a wafer at a submerged position within the electroless plating solution to be contained within the tank;

a planar member disposed above and substantially parallel to the wafer support structure, the planar member capable of being positioned proximate to the wafer to be supported by the wafer support structure such that the planar member serves as an upper confinement boundary for material deposited on the wafer through electroless plating reactions; and

a radiant energy source disposed above the planar member and above the wafer support structure, the radiant energy source being oriented to direct radiant energy through the planar member such that a substantially uniform amount of radiant energy is applied to a top surface of the wafer to be supported by the wafer support structure.

23. An apparatus for depositing a planarizing layer over a wafer as recited in claim 22, further comprising:

radiant energy reflecting surfaces disposed within the tank to facilitate uniform application of the radiant energy to the top surface of the wafer.

24. An apparatus for depositing a planarizing layer over a wafer, comprising:
a tank defined by a bottom and an enclosing wall, the tank being configured to contain an electroless plating solution;

a wafer support structure disposed within the tank, the wafer support structure being configured to support a wafer at a submerged position within the electroless plating solution to be contained within the tank;

a planar member disposed above and proximate to the wafer to be supported by the wafer support structure such that the planar member serves as an upper confinement boundary for material deposited on the wafer through electroless plating reactions;

a backing member disposed against a backside of the planar member, the backside of the planar member facing away from the wafer support structure, the backing member being configured to control a planarity of the planar member; and

a radiant energy source disposed to direct radiant energy through the planar member and to the wafer to be supported by the wafer support structure.

25. An apparatus for depositing a planarizing layer over a wafer as recited in claim 24, wherein the backing member is defined to apply a differential pressure distribution through the planar member to a planarizing surface of the planar member, the planarizing surface of the planar member facing toward the wafer support structure.

26. An apparatus for depositing a planarizing layer over a wafer as recited in claim 25, wherein the backing member includes a distribution of materials having varying spring constants for applying the differential pressure distribution through the planar member.

27. An apparatus for depositing a planarizing layer over a wafer as recited in claim 25, wherein the backing member includes a number of fluid filled chambers for applying the differential pressure distribution through the planar member.

IX. EVIDENCE APPENDIX

There is currently no evidence entered and relied upon in this Appeal.

X. RELATED PROCEEDINGS APPENDIX

There are currently no decisions rendered by a court or the Board in any proceeding identified in the Related Appeals and Interferences section.